SECTION 121

PLASTIC PIPE

121.1 GENERAL: Plastic pipe for pressure and non-pressure uses shall be manufactured from polyvinyl chloride (PVC), high-density polyethylene (HDPE) or ultra-high molecular weight materials.

121.2 REFERENCES.

121.2.1 American Society for Testing and Materials (Latest Editions) (ASTM):

D1248 Specification for Polyethylene Plastics Molding and Extrusion Materials
D1598 Test Method for Time-to-Failure of Plastic Pipe Under Constant Internal Pressure
D1599 Test Method for Short-Time Hydraulic Failure Pressure of Plastic Pipe, Tubing and Fittings
D1601 Test Method for Dilute Solution Viscosity of Ethylene Polymers
D1693 Test Method for Environmental Stress -Cracking of Ethylene Plastics
D1784 Specifications for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds
D2239 Specifications for Polyethylene (PE) Plastic Pipe(SIDR-PR) Based on Controlled Inside Diameter
D2412 Test Method for Determination of External Loading Characteristics of Plastic Pipe by Parallel-Plate Loading
D2657 Heat-Joining Polyolefin Pipe and Fittings
D2737 Specification for Polyethylene (PE) Plastic Tubing
D3034 Specification for type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
F477 Specification for Elastomeric Seals (Gaskets) for joining Plastic Pipe
F679 Specification for Poly (Vinyl Chloride) (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings
F794 Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Ribbed Gravity Sewer Pipe and Fittings Based on Controlled Inside Diameter
F894 Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe

121.2.2 American Water Works Association (Latest Edition (AWWA):

C900 AWWA Standards for Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in. for Water.
C905 AWWA Standard for Polyvinyl Chloride (PVC) Water Transmission Pipe, Nominal Diameter 14 in through 36 in.
C909 Molecular Oriented Polyvinyl Chloride (PVCO) Pressure Pipe 4 in. through 12 in. for Water Distribution

121.2.3 THIS PUBLICATION:

SECTION 800 WATER TRANSMISSION, COLLECTOR DISTRIBUTION AND SERVICE LINES

SECTION 900 SANITARY AND STORM SEWER FACILITIES.

SECTION 1502 SUBMITTALS

121.3 CERTIFICATION: The CONTRACTOR shall submit certification from the manufacturer of the pipe as specified in Section 1502 as to the pipe material and that the pipe meets or exceeds the required testing. Only pipe manufactured in the United States of America will be acceptable.

121.4 GENERAL PLASTIC PIPE REQUIREMENTS

121.4.1 POSITIVE IDENTIFICATION: All plastic pipe shall be coded in accordance with the applicable material standard to eliminate future confusion and prevention accidental damage and service interruption of the facilities.

121.4.2 LINE LOCATOR: Metallic tape shall be used as a locator for all plastic pipe which is installed less then 10 feet deep. The tape should be installed 3 ft. to 6 ft. below top of ground and centered over the pipe. When feasible, the tape shall be fastened to metallic appurtenances associated with the installation (i.e. valves, fittings, manhole rings, etc.) in an effort to enhance its delectability.

121.4.3 PIPE STORAGE: All types of plastic pipe shall be stored in a manner that the pipe will not be deformed as recommended by the manufacturer. PVC or PVCO pipe is subject to potential degradation when exposed to prolonged periods of sunlight. Material degradation is generally indicated by a discoloration of the pipe. PVC or PVCO pipe shall be stored inside a building, under a cover or covered up totally. All discolored pipe shall not be installed and shall be immediately removed form the project.

121.4.4 JOINING SYSTEMS

121.4.4.1 All plastic pipe which is connected to a manhole, junction box, inlet or similar structure shall be installed with an approved manhole connection adapter or water-stop such that each connection is leak-free and that there is no detrimental affect resulting from the material property characteristic differences between the plastic pipe and the structure.

121.4.4.2 Bell and Spigot Joints: Pipe with gasket joints shall be manufactured with a socket configuration, which will prevent improper installation of the gasket and will ensure that the gasket remains in place during joining operations. The gasket shall be manufactured from a synthetic elastomer material and shall conform with the requirements of ASTM F 477. The spigot end of each joint of pipe shall be marked circumferentially to indicate the proper home mark. Pipe, which is field- cut, shall be chamfered and the home mark identified in accordance with the applicable criteria.

121.4.4.3 Heat-Welded Joints: HDPE pipe, which is manufactured without the standard bell and spigot joint configuration shall be joined by a heated fusion process in accordance with ASTM D 2657.

121.5 MATERIALS AND UTILIZATION.

121.5.1 Polyvinyl Chloride (PVC) and Molecular Oriented Polyvinyl Chloride (PVCO) Pressure Pipe:

121.5.1.1 The material in PVC and PVCO pipe shall be in accordance with ASTM D 1784. Also, the material in PVCO pipe shall be in accordance with Molecular Oriented and Polyvinyl Chloride.

121.5.1.2 Pipe shall be suitable for use in the conveyance of water for human consumption. The pipe shall be marked with two seals of the testing agency that certified the pipe material is suitable for potable water use.

121.5.1.3 PVC and PVCO pipe shall be approved by the Underwriters Laboratories (UL) and be furnished in cast iron pipe-equivalent outside diameters. Joints shall be push-on flexible elastomeric gasketed.

121.5.1.4 Pressure pipe shall have a minimum working pressure of 150 psi (DR 18) or as specified on the plans or in the Supplemental Technical Specifications.

121.5.1.5 Pipe lengths shall contain one bell-end or couple with an elastomeric gasket. Gasket shall meet the requirements of ASTM F 477. The bell shall be an integral part of the pipe length and have the same strength and DR as the pipe. The spigot pipe end shall be beveled.

121.5.1.6 PVC pressure pipe in sizes 4-inch through 12-inch shall meet the requirements of AWWA C 900. PVCO pressure pipe in sizes 4-inch through 12 inch shall meet the requirements of AWWA C 909.

121.5.1.7 PVC pressure pipe in sizes 14-inch through 24-inch shall meet the requirements of AWWA C 905.

121.5.2 Polyvinyl Chloride (PVC) Gravity Flow Pipe:

121.5.2.1 The material in PVC pipe shall be in accordance with ASTM D 1784.

121.5.2.2 PVC gravity flow pipe may be used for sanitary sewer and storm drainage applications for sizes 8-inch and greater, except for installation resulting in a depth of cover (to subgrade elevation) less than 3.1 feet or when the Contract documents specifically prohibit its use.

121.5.2.3 Lateral line connections shall be made at manholes or at factory manufactured saddles or tees only, unless specifically authorized by the ENGINEER.

121.5.2.4 PVC gravity flow pipe in sizes 8-inches through 15-inches shall meet the requirements of ASTM D 3034. Only solid wall pipe shall be used. Minimum wall classification shall be SDR 35.

121.5.2.5 PVC gravity flow pipe in sizes 18-inch and larger shall meet the requirements of ASTM F 679 or ASTM F 794. Minimum pipe stiffness shall be 46 psi.

121.5.2.5.1 Sewer service line connections to this pipe will not be permitted, unless specifically authorized in the plans and/or Supplemental Technical Specifications and/or by the ENGINEER.

121.5.3 Polyethylene (PE) Pipe:

121.5.3.1 The material in PE pipe shall be in accordance with ASTM D 1248.

121.5.3.2 High Density Polyethylene (HDPE) Profile Wall Gravity Flow Pipe:

121.5.3.2.1 High-density polyethylene (HDPE), large diameter, profile wall, gravity flow pipe shall meet all general requirements for plastic pipe and shall conform to requirements in ASTM F 894 for diameters of 30-inch and larger.

121.5.3.2.2 Minimum wall thickness in pipe waterway shall be RSC 63. When using ASTM D 2412 for determining the strength value of pipe, the E' number (E = modulus of soil reaction) shall not exceed 1500 psi. The pipe manufacturer shall provide certification to the CONTRACTOR and ENGINEER that the class of pipe used is adequate for the specific pipe laying conditions, including, but not limited to, depth of bury, soil characteristics and groundwater conditions.

121.5.3.2.3 Sewer service line connections to this pipe will not be permitted, unless specifically authorized in the plans and/or Supplemental Technical Specifications and/or by the ENGINEER.

121.5.3.2.4 Lateral line connections shall be made at manholes or at factory manufactured tees or saddles only, unless specifically authorized by the Engineer.

121.5.3.3 All water service lines shall be copper per these specifications.

121.6 MEASUREMENT AND PAYMENT: Plastic pipe used for both pressure and gravity flow shall be measured and paid for at the contract unit pipe as specified in Section 800 and 900 and/or as defined in the Bid Proposal.